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# SUGAR AND DIABETES: MYTHS AND MISLEADINGS

**BY BRITTNEY SALINE**

Type 2 diabetes has become a global epidemic. Despite growing evidence implicating sugar as its cause, Big Soda and industry-funded science continue to point the finger at the scale.





Doctors diagnosed Sean Buchan with Type 2 diabetes in May 2014. That's when the nurse and retired U.S. Army specialist started changing his diet.

The ice cubes clinking against the glass. The bright beads of condensation promising relief from the Ohio humidity; the refreshing zing. Sean Buchan loved sweet tea.

“The sweeter, the better,” the 40-year-old said.

He was open to alternatives. Mountain Dew or root beer—four to five cans each day—hit the spot just as well.

“I figured my options were to drink that or drink water, and I’m not much of a water drinker,” Buchan said.

That changed May 28, 2014, the day Buchan, a nurse and retired U.S. Army specialist, was diagnosed with Type 2 diabetes. Lab results from an unrelated **hemoglobin A1C test** revealed 9.2 percent, which indicated Buchan’s blood sugar had been inappropriately elevated over recent months. Normal levels are within 4.5 to 6 percent, **according to the Mayo Clinic** in Minnesota. Buchan’s doctor prescribed daily doses of metformin, saxagliptin and glipizide—medications designed to decrease the amount of glucose the body absorbs from food and increase the body’s production of and response to insulin.

For Buchan—who weighed 262 lb. at 5 feet 11 inches and hadn’t regularly exercised since his Army days in 2005—the diagnosis was a wake-up call. As a nurse, he administered care for diabetics fighting blindness, amputation and death each day, but he never gave his sugar habit a second thought.

“I had the mentality of, ‘It could never happen to me.’”

Buchan added: “It was kind of my coming-to-Jesus moment. When I got home, I said to my wife, ‘I have got to change the way I eat.’”

## Sweet Scourge

**Diabetes** is a disease in which blood glucose levels become elevated as a result of the body’s inability to produce or respond to insulin, a hormone necessary for the regulation of sugar in the bloodstream. The disease appears in two primary forms: Type 1 and Type 2. **Type 1 diabetes** is an incurable autoimmune disease in which the body’s immune system attacks insulin-producing cells in the pancreas, resulting in little or no production of insulin. Usually diagnosed during adolescence, Type 1 diabetes is regarded as genetic.





Dr. Robert Lustig, author of "Fat Chance: Beating the Odds Against Sugar, Processed Food, Obesity and Disease."

“Sugar is more dangerous than its calories. Sugar is a toxin.

Plain and simple.”

—Dr. Robert Lustig

The problem isn't the United States' alone, however. In 2014, United Nations (U.N.) member states **pledged** to “intensify efforts towards a world free of the avoidable burden of non-communicable diseases, which claims the lives of 36 million people each year” in response to what it calls a “global epidemic of non-communicable diseases” including cardiovascular diseases, cancers, chronic respiratory diseases and diabetes.

Costs related to these diseases will surpass \$7 trillion between 2011 and 2025 in low and middle-income countries alone, according to the U.N.

Unlike Type 1 diabetes, Type 2 is **considered** to be the result of both genetic and lifestyle factors. The question, then, is what kind of lifestyle factors are to blame?

Because the rise of Type 2 diabetes has historically appeared in concert with the rise of obesity, the two conditions are nearly inextricably linked in popular science and industry vernacular. More than 1.9 billion adults worldwide were overweight in 2014, 600 million of whom were obese, the **World Health Organization** reported.

But the math doesn't add up anymore.

In a groundbreaking 2013 **study** titled “The Relationship of Sugar to Population-Level Diabetes Prevalence: An Econometric Analysis of Repeated Cross-Sectional Data,” Lustig—along with scientists from Stanford University; the University of California, Berkeley; and the University of California, San Francisco—reported that “at a population level, however, obesity does not fully explain variations and trends in diabetes prevalence rates observed in many countries ... several countries with high diabetes prevalence rates have low obesity rates, and vice versa.”

**Type 2 diabetes** occurs when the body becomes resistant to the effects of insulin or doesn't produce enough. Both Type 1 and Type 2 diabetes have been **linked** to complications that include heart disease, stroke, blindness, kidney failure, nonalcoholic fatty liver disease and amputation.

Of the **21 million** people diagnosed with diabetes in the U.S. in 2012, Type 1 accounts for **5 percent**, according to the U.S. Centers for Disease Control and Prevention. Type 2 makes up the majority, at 90-95 percent.

If the tales of the living don't convince, perhaps those of the dead will.

“Over 40 percent of death certificates now list diabetes as the cause of death, up from 13 percent twenty years ago,” wrote Dr. Robert Lustig, professor of pediatrics at the University of California, San Francisco and physician at UCSF Benioff Children's Hospital, in “Fat Chance: Beating the Odds Against Sugar, Processed Food, Obesity and Disease.”

In “Fat Chance,” Lustig wrote, “Being thin is not a safeguard against metabolic disease or early death. Up to 40 percent of normal-weight individuals harbor insulin resistance—a sign of chronic metabolic disease—which will likely shorten their life expectancy.”

The statistics came as no surprise to Dr. David Cavan, director of policy and programs for the International Diabetes Foundation (IDF) and former consultant physician at the Bournemouth Diabetes and Endocrine Centre in the U.K. The IDF, which represents more than 230 diabetes associations in 170 countries and territories, **reports** 75 million people living with diabetes in southeast Asia and 37 million in middle-east and north Africa.

“In the Western world, the increase in Type 2 diabetes does correlate very well with the big increase in obesity that has occurred,” Cavan said. “But if we go to some places in Asia, or in the Far East, or in Africa, a large number of the cases of Type 2 diabetes are occurring in people who are either not overweight or they are not significantly overweight, so we have to find an explanation that is not just calories.”

The culprit? Sugar, Lustig said.

“Sugar is more dangerous than its calories,” Lustig wrote in his book. “Sugar is a toxin. Plain and simple.”

## Framing Fat

You don't have to be overweight to be fat.

“There is now very good evidence that accumulation of fat in the liver is one of the steps that leads to the progression of Type 2 diabetes,” Cavan said, “and we know that excessive sugar intake, through stimulating excess insulin production, can directly drive an increasing storage of fat in the liver.”

He continued: “There's this notion of ‘thin on the outside, fat on the inside,’ which describes people who are of relatively normal weight, but who are carrying excess fat in their abdomen, particularly in their liver, that can be a result of their diets and can directly increase risk of Type 2 diabetes.”

Humans now consume double the sugar we did 50 years ago, the IDF reported in its **“Framework for Action on Sugar.”** And the sugar boom isn't contained to the developed world.

“In rural areas, physical activity may be higher, but what we're seeing is that fast foods, high-sugar foods are now available very widely,” Cavan said.

In 2010, China had a diabetes prevalence rate of **11.6 percent**. An estimated 113.9 million Chinese adults had either Type 1 or Type 2 diabetes while a whopping 493.4 million—more than the entire U.S. population—might have had prediabetes.

Still, only **38.5 percent** of China's population was considered to be overweight, compared with **62.6 percent** of Americans in the same year.

Even in low-income developing countries, it is often easier to pop open a Coke than fill a water jug.

“There are some parts of the world where drinking Coca-Cola is safer and cheaper than drinking water,” Cavan said. “You have this bizarre scenario where drinking sugar-sweetened beverages has, to a certain extent, replaced drinking water. You can then begin to understand why the big increase of Type 2 diabetes might be happening in those areas.”

The data led to more questions.

“So this issue was: Is there a possibility that various substances that we consume might have effects separate from their calories?” Lustig said in a phone interview, drawing an analogy to alcohol.

“Alcohol is dangerous not because it's caloric,” he continued, “alcohol is dangerous because it's alcohol.”

Lustig's study compared rates of diabetes prevalence across 175 countries with sugar availability in those countries, while controlling for age, population, poverty, overweight and obesity.

“About 20% of obese individuals appear to have normal insulin regulation and normal metabolic indices ... while up to 40% of normal weight people in some populations manifest aspects of the ‘metabolic syndrome,’” according to the **study**. The authors reported “sugar availability appears to be uniquely correlated to diabetes prevalence independent of overweight and obesity prevalence ... while reduced sugar exposure was associated with decline in diabetes prevalence.”

The study determined that for every 150 total calorie increase per person, diabetes prevalence rose just 0.1 percent. However, if those 150 calories came from sugar, the risk swelled eleven-fold to 1.1 percent.



“It turned out that the (total) calories consumed had no relationship to diabetes prevalence whatsoever, but it was the sugar,” Lustig said.

Two months after the study was published, InterAct Consortium, an international team of researchers studying the influence of genetics and lifestyle on the risk of Type 2 diabetes development, released a [report](#) analyzing the association between consumption of sugar-sweetened-beverages—including artificially sweetened soft drinks—and Type 2 diabetes incidence in European adults.

The consortium found that Europeans who consumed one 12-oz. sugary beverage increased their risk for Type 2 diabetes by 22 percent between 1991 and 2007.

Complementing both studies is a June 2015 [systematic review](#) by Fumiaki Imamura, a senior scientist at the University of Cambridge with a doctorate in nutritional epidemiology. Researchers and faculty from the University of Eastern Finland, Kyoto University and Harvard University also contributed to the study.

The review compared 17 U.S. and U.K. studies analyzing sugar-sweetened-beverage consumption and diabetes prevalence to examine the association between the two, after adjusting for being overweight and obesity. It estimated that for every sugar-sweetened beverage consumed, the consumer’s risk for developing Type 2 diabetes would increase 18 percent over a 10-year period, “regardless of obesity status,” Imamura said.

“Which means that even if people are equally overweight or equally lean, drinkers had a greater risk of (developing) diabetes than nondrinkers,” he continued.

While these studies offer proof of correlation, not causation, Imamura remained convinced.

“That’s similar to the argument about smoking and lung cancer,” he said. “We have never done the randomized control trials of smoking and looking at the risk of cancer, but biologically we believe that smoking causes cancer by damaging your cells and causing mutation ... to me, that’s the same thing.”

Neither are those with Type 1 diabetes immune to the perils of sugar consumption. A June 2015 [study](#) published in *Diabetologia* reported that sugar-sweetened beverages exacerbated [islet autoimmunity](#) in children, a precursor to Type 1 diabetes.



Humans consume twice the sugar we did 50 years ago, and researchers have linked this consumption with increasing rates of diabetes.





Paul Begich, a Type 1 diabetic in Minnesota, said he uses clean eating and exercise to regulate his blood sugar.

Even adults with fully realized Type 1 diabetes can become insulin resistant, developing what is colloquially referred to as “double diabetes,” if insulin levels and sugar intake are not properly managed, Lustig noted.

“There is no question that Type 1 diabetics can develop insulin resistance ... Type 1 does not prevent you from having the cardinal features of Type 2,” he said.

Cavan shared Lustig’s position.

“Type 1 is due to a hormone deficiency, i.e., deficiency of insulin,” he said. “If you replace that insulin, the metabolism works as normally as it can ... and (Type 1 diabetics) will be susceptible to exactly the same changes as someone without Type 1.”

Paul Begich, a 23-year-old competitive CrossFit athlete and coach at CrossFit St. Paul in Minnesota, was diagnosed with Type 1 diabetes at age 15. Like most Type 1 diabetics, he manages his disease by counting his carbohydrate intake and administering insulin. After starting CrossFit in 2011 and adopting a mostly

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—Dr. Robert Lustig

Paleo diet—among other things, trading his standard breakfast of cereal to bacon and eggs—he said he’s able to more easily regulate his blood sugar.

“I definitely can tell the difference between when I eat (high) quality foods and when I eat poor quality foods,” Begich said. “When I eat Paleo or when I eat pretty clean ... I can definitely tell that my blood sugar is a little more stable.”

Type 1 diabetics can prevent manifestations of double diabetes by “following a healthy diet, and avoiding high-sugar foods ... and being physically active,” Cavan said.

So far, it’s worked for Begich.

“The reason I eat the way I eat and train the way I train is because for me it’s helped in the management of my blood sugar and my Type 1 diabetes,” he said. “CrossFit and a Paleo diet are what have allowed me to manage my diabetes to the best of my ability.”

## Sugarcoated Science

“Myth: Eating too much sugar causes diabetes.”—[American Diabetes Association](#) (ADA).

Despite the evidence implicating sugar in the global epidemic of Type 2 diabetes, trusted authorities like the ADA have been reticent to shift their focuses from obesity to sugar as a primary cause of the disease.

The ADA published in its own journal, *Diabetes Care*, a [study](#) revealing a “clear link between SSB (sugar-sweetened beverage) consumption and risk of metabolic syndrome and type 2 diabetes” and admitting that “although SSBs increase risk of metabolic syndrome and type 2 diabetes, in part because of their contribution to weight gain, an independent effect may also stem from the high levels of rapidly absorbable carbohydrates in the form of added sugars.” Still, the association’s party line remains focused on obesity.

“Although calories from simple sugars contribute to calorie excess ... they are seldom the only source,” Dr. Robert Ratner, chief scientific and medical officer for the ADA, wrote in an email via spokeswoman Samantha Boyd. “And there is no connection between consuming sugar and developing type 1 diabetes ... saying that sugar causes diabetes is too simplistic. ... It also fails to put the focus on the many ways that people who are at risk for type 2 can act to prevent, or at least delay, developing it. Those actions include losing weight if overweight (or) obese, getting more physical activity and making healthy food and beverage choices as often as possible.”

Lustig has his own hypothesis regarding the ADA’s reluctance to implicate sugar.

“The ADA doesn’t get it, and they choose not to get it, and one of the reasons they choose not to get it is because they are in the pocket of Big Pharma,” he said of the ADA’s pharmaceutical [sponsors](#).

And the pocket is big.

In 2007, Americans spent \$12.5 billion on prescription drugs for diabetes; in 2019, that number is expected to surpass \$55 billion, Jeff O’Connell wrote in his book, “Sugar Nation.”

“An industry that forms around a chronic disease such as type 2 diabetes can be self-perpetuating,” he wrote. “More money can be made treating diabetes than curing it.”

It’s unsurprising the ADA chooses to focus on physical activity and weight loss as a primary offensive tactic in the fight against diabetes. It’s the same gospel [preached](#) by the sugar industry and Big Soda, including Coca-Cola, one of the ADA’s philanthropic [supporters](#).

In a 2013 [ad campaign](#), Coca-Cola touted its low-calorie beverage options and partnerships with fitness programs. PepsiCo defends its products in the name of moderation, offering “good for you,” “better for you” and “fun for you” [selections](#). Neither company advises its consumers to follow the World Health Organization’s [recommendation](#) to reduce [free-sugar](#) intake to less than 10 percent of total daily caloric intake and ideally less than 5 percent.

Cavan, who still practices medicine at Bournemouth, said he advises his patients to quit soda altogether.

“(Sugary drinks) confer absolutely no benefit and actually they may confer harm,” he said. “There are not many things where I say ‘just don’t go there,’ but that is one of them. ... To me, moderation means just avoiding them completely.”

Diet sodas aren’t above scrutiny either.

Imamura’s review also compared consumption of artificially sweetened drinks with diabetes prevalence. His team estimated that one drink per day would increase the consumer’s risk for Type 2 diabetes by [25 percent](#).



Lustig offered an explanation as to why artificially sweetened drinks might trigger the same influx of insulin as their sugary counterparts.

“You put something sweet on the tongue and the tongue tells the brain, ‘sugar is coming, get ready to release the insulin,’” he said. “The data shows that the pancreas releases the insulin, and you end up eating more.”

## Sugar Free

After Buchan broke the news of his Type 2 diabetes diagnosis to his wife, he stopped drinking soda and sweet tea and took up a water habit.

“It was a tough transition at first, but once you get used to it, it’s easy,” he said.

On his doctor’s recommendation, he adopted a diet low in sugar and other carbohydrates and high in lean protein, monounsaturated fats and vegetables. A few months after his diagnosis, Buchan joined CrossFit Dedication in Vandalia, Ohio, training three times per week.

After six months, Buchan was cleared to stop taking two of his three medications for Type 2 diabetes. His latest labs, taken three months ago, revealed a hemoglobin A1C level within the normal range at 5 percent.

“I don’t feel myself getting run down,” he said. “I have more energy, I’m feeling stronger.”

Buchan hopes others with Type 2 diabetes—or a sugar habit that could lead to it—will learn from his story.

“The biggest thing is educating people,” he said. “I know what diabetes can do if you don’t get it under control. I (said), ‘That’s not gonna be me.’” ■

## ABOUT THE AUTHOR

Brittney Saline contributes to the CrossFit Journal and the CrossFit Games website. She trains at [CrossFit St. Paul](#).

After Buchan changed his lifestyle, test results revealed blood glucose levels had returned to normal levels.

